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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,908	12/18/2006	Robert Drake	71,049-006	2127

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HOWARD & HOWARD ATTORNEYS PLLC  
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Royal Oak, MI 48067

EXAMINER
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MURATA, AUSTIN

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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02/01/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/573,908	<b>Applicant(s)</b> DRAKE ET AL.	
	<b>Examiner</b> AUSTIN MURATA	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 9, 10, 17, 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11-16, 18 and 21 is/are rejected.
- 7) ☒ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/29/2008; 3/23/2007</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This is a non-final action.

Claims 1-21 are pending filed on 3/29/06.

Claims 9, 10, and 17 are canceled.

Claims 19 and 20 are non-elected.

### ***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.
2. This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.
3. In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.
4. Group I, claim(s) 1-8, 11-16, 18, and 21, drawn to a method of applying a patterned thin-film.
5. Group II, claim(s) 19 and 20, drawn to a substrate comprising a thin film.
6. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The common technical feature between the groups is the thin film created by the steps of plasma treating, applying a liquid coating material comprising one or more compounds selected from the group of organopolysiloxane polymers, organopolysiloxane oligomers, siloxane

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resins and polysiloxanes, onto the substrate surface by a soft lithographic printing technique to form a pattern thin-film thereon and where required removing residual liquid coating material from the substrate surface, which process does not require the liquid coating material undergo a curing step, is not special. The common technical feature is taught by CLEM et al. (US 6,518,168) column 19, example 1.

7. During a telephone conversation with MR. CHRISTOPHER ANDRZEJAK on 1/12/10 a provisional election was made with traverse to prosecute the invention of a method of applying a patterned thin-film, claims 1-8, 11-16, 18, and 21. Affirmation of this election must be made by applicant in replying to this Office action. Claims 19-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

8. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Priority***

9. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in United Kingdom on 10/4/2003. It is noted, however, that applicant has not filed a certified copy of the GB 0323295.6 application as required by 35 U.S.C. 119(b).

### ***Claim Rejections - 35 USC § 103***

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10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**12. Claims 1-5, 7-8, 11-13, 15, 16, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over BAO et al. (US 2004/0231781) in view of CLEM et al. (US 6,518,168)**

13. Regarding claim 1,

14. BAO et al. teaches in the abstract, "method of creating patterns on substrates" (method of applying a patterned thin-film onto a substrate). The reference further teaches corona treatment utilized on the substrate, paragraph [0080] (plasma treating the substrate). BAO et al. also teaches printing polymers, that may be thermoplastic, thermosetting, thermoplastic elastomer, and may be crosslinked, crosslinkable, or non-crosslinked, paragraph [0071] (a variety of polymers can be utilized). The reference

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also teaches the same “soft lithographic printing technique” described in paragraph [0045], lines 15-19, of the instantly disclosed specification by providing a transfer member with protusions and recesses paragraph [0012], and using the protrusions to print a pattern onto the substrate see **figure 1**. The method of BAO et al. does not require removal of residual liquid from the substrate surface as the step is not included. Due to the polymer ink already being polymerized before deposition onto the substrate, a curing step is not required.

15. The reference teaches using a polymer ink but does not expressly teach using organopolysiloxane polymers, organopolysiloxane oligomers, siloxane resins and polysilanes.

16. However, CLEM et al. teaches using a similar micro-printing process for depositing, in monomer form, alkylsiloxane column 14 lines 44-45 and octadecyltrichlorosilane column 21 lines 43-44, self assembled monolayers onto a substrate.

17. At the time of the invention it would have been *prima facie* obvious to one of ordinary skill in the art to use the monomers of CLEM et al. and polymerize them before stamping ( $\mu$ CP ) the pattern onto the substrate because, “This polymer inking technique has several advantages over other high throughput patterning techniques such as  $\mu$ CP and NIL,” paragraph [0049].

18. Regarding claim 2,

19. CLEM et al. teaches in column 9 lines 63-66, “heights of features formed on surfaces in accordance with the invention of the above dimensions can be achieved as

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well, including an embodiment with lines of height smaller than 0.08 micron" (patterned thin-film has a thickness in the region of from 1 to 100 nm.

20. Regarding claim 3,

21. BAO et al. teaches in paragraph **[0080]** corona treating the substrate (wherein step (i) is carried out utilizing a suitable source selected from the group of a corona discharge source).

22. Regarding claim 4,

23. CLEM et al. expressly teaches using glass (glass) and polar polymeric surface (plastic) in column 14 line 59. BAO et al. teaches using metals, semiconductors, dielectrics and polymers, paragraph **[0076]**.

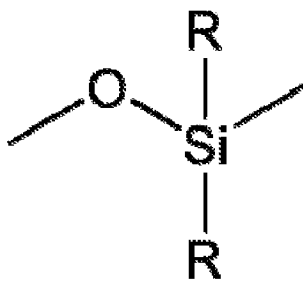
24. Regarding claim 5,

25. BAO et al. teaches a pretreating step of a chemical primar layer or a corona treatment layer, paragraph **[0080]**.

26. Regarding claim 7,

27. CLEM et al. teaches using an alkylsiloxane which is a monomer with a Si-O backbone with an alkyl (carbon chain) attached as an R group, see illustration.

Polymerization of the monomer would inherently be linear or cyclic.



28.

29. Regarding claim 8,

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30. CLEM et al. teaches using alkylsiloxane but does not expressly teach the alkyl (hydrocarbon chain) group being between 1 and 40 carbon atoms. However, teaching an alkyl group but not teaching the exact carbon chain length teaches chain lengths between  $\text{CH}_3$  to  $\text{C}_n\text{H}_{(2n+1)}$  which overlaps with the range of between 1 and 40 carbon atoms. The overlap of ranges is considered a *prima facie* case of obviousness MPEP 2144.05 I. At the time of the invention one of ordinary skill in the art would have understood that an alkyl group could consist of a carbon chain between 1 and 40 carbon atoms.

31. Regarding claim 11,

32. BAO et al. teaches a very similar process as the printing process described in the instantly disclosed specification paragraph [0045] as it uses a stamp-like applicator to imprint patterns onto a substrate where the protrusions contact the substrate, see BAO et al. figure 1.

33. In addition, CLEM et al. teaches the same “soft lithographic printing technique” described in the instantly disclosed specification in paragraph [0045]. CLEM et al. figure **1a**, “a surface **12** at least outward facing portions **16** thereof, coated with a self-assembled monolayer (SAM) forming species **17**. When the applicator is applied to the substrate **18** and removed, a SAM is formed at regions **20** of the substrate contacted by outward facing surfaces **16**.”

34. Regarding claims 12 and 15

35. CLEM et al. teaches in column 20 lines 27-29, “a stamp including protrusions of parallel lines was first applied to the surface, removed and rotated 90°, and reapplied”



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(an additional coating is applied to form a second layer on the patterned film) (using a soft lithographic printing technique).

36. Regarding claim 13,

37. The combination of BAO et al. and CLEM et al. teaches the limitation of claim 1 but does not teach the process being continuous, however making a process continuous is not a patentable feature, see MPEP 2144.04 V(E).

38. Regarding claim 16,

39. CLEM et al. teaches using alkylsiloxanes, column 14 line 51, as the material being patterned on the substrate. Polymerized or not, the alkyl group is a saturated hydrocarbon chain (nonpolar) which will make the patterned left on the substrate hydrophobic.

40. Regarding claim 21,

41. CLEM et al. teaches in column 2 line 36-38, applying a blocking agent pattern and material is deposited in a pattern complementary to the blocking pattern. (a region of the substrate surface is masked to substantially prevent or inhibit further physical or chemical changes to the previously uncoated, partially coated or fully coated substrate surface during a process step).

**42. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over BAO et al. (US 2004/0231781) and CLEM et al. (US 6,518,168) as applied to claim 1 in further view of SPENCE (US 6,083,355).**

43. Regarding claim 6,

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44. BAO et al. teaches a pretreating step of a corona treatment layer, which involves oxygen molecules breaking into atomic form and bonding to the substrate, but does not expressly teach the process occurring at atmospheric pressure.

45. However, SPENCE teaches in column 1 lines 39-41, that corona treatment can be done at atmospheric pressure when plasma treating polymer films.

46. At the time of the invention, it would have been *prima facie* obvious to one of ordinary skill in the art to use an atmospheric form of corona treatment because it is an economical means for surface modification, column 1 lines 44-45.

**47. Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over BAO et al. (US 2004/0231781) and CLEM et al. (US 6,518,168) as applied to claim 1 in further view of NOMURA et al. (US 2003/0211342).**

48. Regarding claims 14 and 18,

49. The combination of BAO et al. and CLEM et al. teaches creating the patterned layer of claim 1, but does not expressly teach using the pattern to modify the alignment of liquid crystal.

50. However, NOMURA et al. teaches that it is known in the art to use siloxane and silane compounds in thin films to modify the properties of liquid crystal alignment, paragraph [0023].

51. At the time of the invention it would have been *prima facie* obvious to one of ordinary skill in the art to use the silane and siloxane elements as a patterned layer for modifying liquid crystal alignment because the modifications are resistant to degradation, NOMURA et al. paragraph [0023].

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AUSTIN MURATA whose telephone number is (571)270-5596. The examiner can normally be reached on Monday through Friday 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MICHAEL CLEVELAND can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AUSTIN MURATA/  
Examiner, Art Unit 1792

/Michael Cleveland/  
Supervisory Patent Examiner, Art Unit 1792

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